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ABSTRACT

Ways are described that Michigan Technological University has responded to the national need of internationalizing the engineering curricula by integrating engineering coursework with courses in area and international studies and ensuring the development of proficiency in several foreign languages. The university's approach focuses on Germany. Students can take traditional courses in language and literature, as well as courses in Scientific German, German for Business, intercultural communication, pre-departure orientation for study abroad, and courses leading toward certification. An internship in Germany culminates the students' linguistic and professional training. Details on the internship program are provided. (LB)

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# INTERNSHIPS IN GERMANY
## UNIQUE OPPORTUNITIES FOR STUDENTS OF SCIENCE AND ENGINEERING

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Competing successfully in the international market requires language skills, cultural awareness, and international experience. In the standard engineering and science curriculum, however, these issues are generally not addressed. In the 1989 policy statement, the American Council on Education states that American educators "should produce sufficient numbers of language-competent citizens to meet national needs - in business, in the professions, and in government." The Council believes that language departments cannot achieve that goal alone. The Council urges colleges and universities to "provide opportunities for students in all disciplines and pre-professional programs to achieve high levels of foreign language proficiency by a combination of preparatory courses, intensive courses, and foreign study and internships, as well as the infusion of international and foreign language materials into substantive disciplinary courses." [1]

In order to meet the challenge of a global economy, many American universities have added programs in international business and made great efforts to add the appropriate international content to a number of professional degrees. Michigan Technological University, one of the leading universities in undergraduate engineering education, has responded to the national need of internationalizing the engineering curricula by integrating

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engineering coursework with courses in area and international studies and ensured the development of proficiency in several foreign languages. Michigan Tech has prepared many students to assume future leadership positions which require an understanding of the role the United States will play within an international context. These students have acquired international skills necessary to anticipate, manage, and adapt to rapid changes in the global technological scene.

Nationwide, universities trying to internationalize the curriculum have encountered problems in reconciling coursework required by the accreditation and courses which will prepare students to work in a global market. Courses in foreign languages and international studies would add even more time to the completion of the degree requirements. However, at MTU, the general education requirements make it possible to integrate foreign language and literature courses in the required Upper Division Thematic Studies which are courses outside the students' major. Therefore, students in science and engineering can finish a B.S. degree within four years, take three years of a foreign language, several area study courses, and gain professional experience in an internship abroad without any neglect of technical subjects.

Since the Federal Republic of Germany is one of the most important trading partners of the United States, knowledge of German and experience gained in Germany will greatly enhance the career opportunities of Michigan Tech graduates who would like to

represent multinational companies in the very competitive unified Europe of 1992 when almost all of Western Europe will form a single economic community, thus creating an economic giant with whom the United States must compete. Within this community, the Federal Republic of Germany will be a leader in exports and in economic development and will have a compelling influence on world trade for many years to come. Germany is also one of the world's leaders in technology and Europe's most distinguished manufacturing power. At Michigan Tech, the largest number of students is studying mechanical engineering, with options in manufacturing and automotive engineering, i.e. areas in which Germany is particularly strong. Therefore, the main focus of the University's effort to internationalize the education of students in science and engineering has been on Germany.

Students of German at MTU have many opportunities to develop a global perspective. In addition to the traditional courses in language and literature, students can take courses in Scientific German, German for Business, intercultural communication, pre-departure orientation for study or work abroad, as well as courses leading towards certification. The culmination of the students' linguistic and professional training is an internship in Germany. The internship has added an important dimension to the goal of global competence which cannot be achieved through classroom instruction alone. To be sure, students would learn more about Germany if they could study abroad for one year but for most students, a three-months summer internship is all they can afford

timewise or moneywise.

Many American universities have made great efforts to internationalize their course offerings and expose their students to more international issues. In 1990, more than 6,400 students from over 1,000 colleges and universities took part in short-term work experiences arranged by the Council on International Educational Exchange.[2] In the Work Abroad Programs in various countries, students can improve their linguistic skills and cultural awareness; however, most students find placement mainly in service jobs (hotels, restaurants, etc.), not in their professional fields.

Michigan Tech's internship program in Germany started in 1986. As a teacher of German language and literature I believe strongly in the benefits students derive from exposure abroad, be it through study or work. Since almost all of my students are majoring in engineering and science, I began to search for a program that would meet the needs of the students, get the approval of the administration, and be affordable for all involved. In my search I encountered several stumbling blocks. First of all, the location of the University acted as a disadvantage. Michigan Tech is located in a small town in the remote Keweenaw Peninsula of the Upper Peninsula of Michigan. There is very little industry in the area leave alone German companies that would send students abroad for summer jobs. Furthermore, the University did not have membership in the Council on International Educational Exchange, the International Association for the Exchange of Students for

Technical Experience (IAESTE), or other agencies promoting global experience. Fortunately, the German Academic Exchange Service helped me to get the program off the ground and has been my partner ever since. [3]

The guidelines for application and selection provided by the German Academic Exchange Service were slightly modified to include local standards and procedure. In order to be eligible, students must meet the following requirements:

a) U.S. citizen

b) junior or above at time of application

c) two years of college-level German or equivalent

d) G.P.A. of at least 2.8 (4.0)

e) practical experience

I never had to recruit students for this program; most of the time I had more interested students than I had anticipated. However, since this program encompasses a reciprocal arrangement, Michigan Tech must offer an equal number of positions to German students, for a similar period of time and with comparable remuneration. Finding enough positions for German students on campus was at times difficult but nevertheless achievable. In the six years that the program has been in existence, 48 Michigan Tech students had the opportunity to work in Germany and 49 German students gained experience in their fields of study on the Michigan Tech campus. This year, eleven MTU students applied for the internships and were selected.

Advisors and administrators raised several questions about the

program. First of all, there should be no change in the students' core courses as well as the quality of the instruction, i.e. foreign language courses should not be added at the expense of engineering and science classes. Furthermore, the students should get credit for the overseas work experience, it should fit into the total program and meet all ABET accreditation requirements. Last but not least it should not add extra courses to a curriculum which is already packed. Since the majority of our students wants to graduate in four years, adding more time for the completion of the degree was out of the question.

With proper planning students can finish their degrees in four years. Michigan Tech has several incentives for all students to include an international dimension in their education:

MTU awards placement credit for up to two years of foreign language study.

MTU offers a Certificate in Foreign Language and Area Study.

MTU offers an Advanced Certificate in Foreign Language and Area Study.

MTU offers a Certificate in International Technology and Society.

MTU, as a testing center for the Goethe Institute, makes it possible for students to receive internationally-recognized certificates of competence in German.

MTU encourages students to include advanced language and literature courses in the required Upper Division Thematic Studies (courses outside the major field).

The College of Engineering was particularly interested in the quality of the overseas internship and the benefits students would derive from this experience. At the outset of the program we did not know what the impact on the students would be and we simply had to take a risk. After six years of experience we can honestly promote the program and state the benefits for the students.

Some advantages of an internship in Germany are:

Students will have the opportunity to live for three months in Germany where they can use German in a real-world setting. Nothing improves language proficiency more than total immersion in the society where the language is spoken.

Students perform a meaningful job using their expertise in engineering or science.

Students learn how organizations and companies work in Germany.

Students learn to deal with other viewpoints and expectations. They also learn to adapt to different environments and overcome culture shock.

Students develop broader perspectives through comparisons; they learn to appreciate differences and similarities and increase their cultural awareness.

Students share their experiences abroad with other students who participated in the program or want to participate. This discussion among the students almost always intensifies the awareness of the actual learning that had taken place.

Students mature rather fast during this work assignment abroad

and are thus better equipped to define their career goals.

Students develop contacts for future employment.

Students build the capacity for lifelong learning. Almost all of the students went on to graduate school.

Students have better chances for placement because many employers value the international work experience.

Having the edge in career placement has been particularly important to the students. About one third of the participants have been women who seemed to have benefitted the most as far as employment. Needless to say that all interns found satisfactory jobs. As a matter of fact, former participants are now recruiting here and several companies have contacted me because they had hired a graduate of my program who had international know-how in addition to the degree in engineering.

The network that we started in 1986 is beginning to pay dividends: one of my students who is now working in Germany has hired two MTU students as summer interns and one of the German participants has found placement for another MTU student. As more and more of the participants climb into positions where they can influence hiring, more direct contacts in the US and in Germany will certainly benefit the program. I would also like to point out that several graduates of the program studied in Germany for at least one year. Likewise, German interns have returned to Michigan Tech for a graduate degree.

The internship in Germany is one of the most important components in Michigan Tech's program to educate engineers and

scientists who can function optimally in German-speaking countries. Students receive credit for the work experience which can be counted towards the degree as either co-op credit, credit in language and intercultural communication, or credit for projects or research. In addition, credits can be applied towards the Certificate and Advanced Certificate in Foreign Language and Area Study.

The cost of the program for the students is relatively small compared to the tremendous benefits derived. Since the German Academic Exchange Service charges no application fee, students pay about $600 for airfare, $400 for weekend excursions and incidentals. They earn a minimum of DM 900 per month which covers all living expenses while abroad since employers provide relatively inexpensive housing. Many students, especially those with advanced computer skills, came home with money in their pockets.

The cost for Michigan Tech is also low. German students receive $600 per month which was shared equally by the Deans of the College of Engineering and the College of Sciences and Arts and the professors for whom the students worked. This year, due to budget cuts, the College of Engineering withdrew the support of the program. Fortunately, I found enough professors who believe strongly in the program and were willing to pay the total cost. The Office of International Programs provides some money to cover cost for copying, postage and telephone calls.

To make the experience abroad as beneficial as possible, students prepare for it not only by studying German but also by

attending a pre-departure orientation. These orientation sessions have made a world of difference. Past participants share their experiences and give hints about a realm of things from travel to housing and shopping. In the more structured sessions that I conduct students learn successful adjustment strategies, talk about rules of interaction in the workplace, acceptable behavior, taboos, work ethics, camaraderie, etc. Above all, they simulate situations and learn to cope with culture shock.

Just as important as the pre-departure orientation is a re-entry workshop. Most students suffer from culture shock after their return to the United States. Discussing their experiences with other students who have been in similar or worse situations helps speed up their re-adjustment process. Students are also asked to write a report about their work assignment, their travels, leisure time activities, expenses, and social interactions. These reports are also made available to every student who is interested.

Although the program does not have any problems per se, it does present a steady source of frustration for me. The greatest and most annoying disappointment stems from the attitude of some engineers who consider the study of a foreign language neither necessary nor desirable. The professors who support the program and offer positions to German students are either foreign born, have studied a foreign language, have research links with Germany, or do it as a special favor to me or a student. In other words, the internship is not always viewed as a significant part of a student's global education; as a matter fact, for some professors

and administrators, the study of global issues is not necessary in engineering education. Therefore, foreign language teachers who want to develop an internship program should have tenure because program development does not always bring the same rewards as publications and grants do.

The internship program in Germany has been very successful. The quality of their engineering and science education combined with their linguistic skills has made it possible for MTU students to be placed in such prestigious companies as Siemens, Mercedes-Benz, Audi, BMW, Volkswagen, Porsche, Continental, Philips, Klöckner, and Chemische Werke Hüls. Moreover, several MTU students have worked in research institutes at the universities of Stuttgart, Erlangen, München, Saarbrücken, Siegen, Hamburg, and Bayreuth. In the last four years, placement has been 100%.

Michigan Tech graduates of the interdisciplinary program that combines technological expertise, broad-based coursework in business and the social sciences, in-depth-study of German, and the experiential learning opportunity of an internship will have a keen understanding of political, social, economic, and cultural issues of present-day Germany, thus broadening the range of their career opportunities in the competitive international arena. Graduates of this program will contribute to enhanced trade and technology transfer between the United States and German-speaking countries.

## Notes

[1] What we can't say can hurt us: A call for foreign language competence by the year 2000 (Washington, DC: American Council on Education, 1989) 2-3.

[2] "Schools Recognized for Participation in Work Exchange Program." Campus Update, March 1991: 8.

[3] John Grandin, "Developing Internships in Germany for International Engineering Students," Die Unterrichtspraxis 24 (1991): 209-214. Grandin who was instrumental in developing an international engineering program at the University of Rhode Island states that the development of a successful internship program has been "one of the greatest challenges for the organizers." (209)